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## A Theory of Human k-shot Learning and Consciousness

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4:00 – 5:30pm Pacific time

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## Abstract

From a well-accepted law of thermodynamics, a theory of human-like k-shot learning is derived. The theory is implemented as a hierarchical VAE and VAE-based universal compressor model. Classical wisdom is that all learning paradigms compress data to smaller models at the training stage. Our theory indicates that nontrivial compression also happens in the inference stage. This is particularly important for few shot learning when training data is scarce. We prove that all other possible models for human or animal k-shot learning approximate our theory. The model achieves human level performance and significantly better performance than baseline models including deep learning models. This bridges the gap between our common-sense few-sample human learning and large-data machine learning, and can be easily applied in practice. (Joint work with Zhiying Jiang)

## Biography

Ming Li is a Canada Research Chair in Bioinformatics and a University Professor at the University of Waterloo. He is a fellow of Royal Society of Canada, ACM, and IEEE. He is a recipient of Canada's E.W.R. Steacie Fellowship Award in 1996, the 2001 Killam Fellowship and the 2010's Killam Prize. Together with Paul Vitanyi, they co-authored the book "An introduction to Kolmogorov complexity and its applications."

All are welcome.
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